

DISENGAGEMENT MECHANISM FOR FILM PRE-LOADING AND FILM PRE-LOADING METHOD

PRIORITY

5 The present application claims priority from co-pending provisional patent application serial number 60/400,628, Filed on August 2, 2002 and entitled DISENGAGEMENT MECHANISM FOR FILM PRE-LOADING AND FILM PRE-LOADING METHOD.

FIELD OF THE INVENTION

10 The present invention relates to the field of cameras and, more particularly, to a disengagement system and method for pre-loading a camera with film.

BACKGROUND OF THE INVENTION

 Inexpensive cameras, such as single use cameras, have been provided which are pre-loaded with film in the factory, optimally in non-darkroom conditions. In those
15 cameras, the film has been drawn from the film cassette and the unexposed film is scrolled into a roll of unexposed film on a film spool located opposite the film cassette. An exposure chamber containing a shutter and lens mechanism is located in the film path between the film spool and the film cassette. The film cassette is loaded into the film cassette receiving chamber and engaged with the film advance wheel. The film leader is
20 pulled from the film cassette, engaged with a sprocket, passed over the exposure chamber and is attached to the take-up spool. The film is then pre-wound onto the take-up spool.

 Exposed film is rewound back into the film cassette by winding the advance wheel after an exposure has been made. After all exposures have been made, the film is completely rewound into the film cassette.

25 To prevent error by the user, an anti-reversal pawl mechanism is provided to ensure the advance wheel can only be turned in one direction by the user. However, this mechanism additionally prevents the advance wheel from being turned in a direction necessary for pre-loading the film on the take-up spool.

 Several methods are known for disengaging an anti-reversal pawl mechanism
30 and/or metering system for film pre-loading. United States Patent No. 6,016,404 to

DiRisio discloses a one-time-use camera with anti-backup pawl disengaged from the film winder during film loading. In the '404 DiRisio patent, an anti-backup pawl has a pair of flexible aligned fulcrum support connections with the main body part. An actuator at a free end of the anti-backup pawl protrudes into the film take-up chamber and is movable to disengage the anti-backup pawl from the thumbwheel in response to the film spool being received in the film take-up chamber such that the film spool is moved against the actuator. When the rotation tool is separated from the film spool the anti-backup pawl pivots to engage the pawl end with any of the teeth on the underside of the film winding thumbwheel and the actuator displaces the film spool from the film unwinding position in the film take-up chamber to a film winding position in the chamber. Similarly, United States Patent No. 6,049,675 to DiRisio and Lawther discloses a one-time-use camera with anti-backup pawl engaging film winder responsive to film loading. In the '675 DiRisio patent the inherently flexible anti-backup pawl is a cantilever having a support end integrally connected with the main body part within a top hole in the main body part. The anti-backup pawl is inherently biased to urge a pawl end out of engagement with respective teeth on the underside of the film winding thumbwheel to allow unwinding rotation of the thumbwheel clockwise. An actuator proximate the support end of the anti-backup pawl protrudes into the film take-up chamber. When the actuator is pushed towards the top hole, the anti-backup pawl is pivoted at the support end to engage the pawl end with any one of the teeth to prevent unwinding rotation of the thumbwheel.

United States Patent No. 6,038,402 to Horning and Rydelek discloses a method of disengaging the anti-backup pawl from the film winder to permit unexposed filmstrip to be pre-wound from the film cartridge during manufacture of a one-time-use camera. The '402 Horning patent discloses a single use camera including an anti-backup pawl located in a slot of the rear cover and having an integral pair of flexible fulcrum support connections with the rear cover in the slot. A free (movable) end of the anti backup pawl is located opposite one end of the slot. Another free (movable) end, i.e. the pawl end engages the thumbwheel to prevent its unwinding rotation. The fulcrum support connections are arranged between the free end and the pawl end in the slot to permit the anti-backup pawl to be pivoted at the fulcrum support connections to move the free end

inwardly of the slot and to move the pawl end outwardly of the slot, in order to disengage the pawl end from the thumbwheel. The anti-backup pawl is disengaged by manually pushing a disengaging tool against the free end of the anti-backup pawl to pivot the anti-backup pawl at the fulcrum support connections and depress the free end inwardly of the slot and move the pawl end outwardly of the slot in order to disengage the pawl end from the thumbwheel. Additionally, the '402 Horning patent discloses a prior art method of manually disengaging the anti-backup pawl from the thumbwheel involving inserting a disengaging tool behind the anti-backup pawl and prying the anti-backup pawl outwardly from the thumbwheel.

United States Patent No. 6,226,457 to Boyd et al. discloses a one-time-use camera loading method. The '457 Boyd patent discloses an anti-backup subsystem mounted on the camera frame assembly and having a first mechanical member biased into a disengaged position. A main portion of the filmstrip is then wound, in a pre-wind direction, from the film cartridge to a film supply chamber of the camera from assembly. Following the winding, the first mechanical member is biased into an engaged position, in which the anti-backup system precludes winding of the filmstrip in the pre-wind direction. The first mechanical member can be biased by applying a label to a casing of the camera.

What is needed is a simple system and method for pre-loading a camera. What is further needed is a special disengagement fixture used to disengage the metering system of the camera before the film pre-winding is performed. These objects, as well as others, are satisfied by the present inventions.

SUMMARY OF THE INVENTION

A system and method for pre-loading film into a camera in non-darkroom conditions is provided. A fixture or tool is used to disengage the film metering system for pre-loading the camera with film. In one particular embodiment, a fixture is provided
5 for simultaneously biasing the anti-reversal pawl away from the film advance wheel and the release claw and striker away from the sprocket shaft to permit film pre-winding. The prongs of the fixture gain access to the sealed camera through a pair of holes through the front face of the camera.

Other objects and advantages of the present invention will become more readily
10 apparent in the description that follows.

BRIEF DESCRIPTION OF THE DRAWINGS

The foregoing summary, as well as the following detailed description of the preferred embodiments, is better understood when read in conjunction with the appended drawings. For the purpose of illustrating the invention, there is shown in the drawings an exemplary embodiment that is presently preferred, it being understood however, that the invention is not limited to the specific methods and instrumentality's disclosed. Additionally, like reference numerals represent like items throughout the drawings. In the drawings:

Fig. 1 is a rear perspective view of a camera having parts removed to more clearly show various subsystems of the camera.

Fig. 2 is a top plan view of a camera having parts removed to more clearly show various subsystems of the camera.

Fig. 3 is an enlarged portion of Fig. 2 with the cover shown in shadow and having the metering subsystem in its normal state.

Fig. 4 is an enlarged portion of Fig. 2 with the cover shown in shadow and having the metering subsystem disengaged by a tool in accordance with one embodiment of the present invention.

Fig. 5 is a side plan view of a tool in accordance with one embodiment of the present invention.

Fig. 6 is a rear perspective view of the tool of Fig. 5

Fig. 7 is a perspective view of a camera being readied for preloading in accordance with the present invention.

Fig. 8 is a perspective view of a sprocket shaft assembly useful with the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

Before explaining the disclosed embodiments of the present invention in detail, it is to be understood that the invention is not limited in its application to the details of the particular arrangement shown since the invention is capable of other embodiments. Also,
5 the terminology used herein is for the purpose of description and not of limitation.

The present invention relates to a system and method for preloading film in a camera. A tool, which is desirably a fixture on an assembly jig but may alternately be a handheld tool is passed through the cover of the camera to disengage the metering system and permit the film to be pre-wound prior to use. More specifically, in one particular
10 embodiment, a pair of prongs on the disengagement tool are passed through openings on the front cover of the camera. A first prong disengages an anti-reversal pawl mounted on the body of the camera and normally engaged with the film advance wheel. The second prong is angled to bias the release claw and striker of the metering system away from cams on the sprocket shaft to permit the sprocket to rotate freely in both directions.

15 Referring now to Figs. 1 - 8, there is shown a rear perspective view of a camera 10 having parts removed to more clearly show features of the film metering, anti-reversal and exposure subsystems. Camera 10 includes a main body portion 12 located between a front cover 14 and a rear cover 15. Main body portion 12 is molded to contain a film cassette receiving chamber 16 and a take-up spool chamber 18. The take-up spool
20 chamber 18 is designed to receive a spool 20 therein. The bottom portion of the spool 20 includes a socket 22 designed to extend through the outer covers 14 and 15 and engage a rotatable tool 50 for pre-winding the film. One such film pre-winding method is described in United States Patent No. 6,226,457, that patent being incorporated herein.

Mounted on or integral with the body 12 are portions of the film transport and
25 metering system, as well as the anti-reversal pawl 24. Anti-reversal pawl 24 is designed to engage with the teeth on the advance wheel 26 to permit winding in only the film advance direction. Attempting to wind the film in the pre-wind direction will cause the pawl end of the anti-reversal pawl 24 to lodge between adjacent teeth of the advance wheel 26 preventing movement of the advance wheel in that direction. Anti-reversal

pawl 24 additionally includes a tab 24a which extends above the advance wheel 26, as will be described more fully herebelow.

5 A sprocket 28 extends into the film path through the main body 12 in order to engage the film. As shown more specifically in Fig. 8, the sprocket 28 is attached to a sprocket shaft 30. In one embodiment the sprocket shaft 30 connects to the sprocket 28 at a square hole formed in the sprocket 28. Additionally fixed to the sprocket shaft 30 are the primary cam 32 including a notch 32a and a secondary cam 34. Secondary cam 34 engages an extension of the striker 36 to rotate the striker 36 back to the charged position. The cams 32, 34 are secured to the shaft 30 and rotate with the sprocket 28, one
10 revolution for each film frame.

Additionally mounted on the main body 12 are the striker 36 and the release claw 38, both of which are spring biased into their normal positions. Release claw 38 includes, among other features, a follower portion 38a and a spur portion 38b. The striker 36 is engaged with the trigger button 37 and includes a tab 36a and a cam follower finger 36b.
15 The release claw 38 is normally spring biased by spring 39 such that follower portion 38a follows the outer surface of the cam 32 and after a film frame exposure is wound into the film cassette (not shown). When the camera is readied for the next exposure, the follower finger 38a is forced all the way into the notch 32a and the striker tab 36a rests against the release claw shoulder 38c. However, the follower portion 38a is shaped to
20 hook the edge of notch 32a to not permit rotation in the pre-winding direction, only in the winding direction (from the spool to the film cassette). Similarly, a finger 36b on the striker 36 hooks a notch 34a in the secondary cam 34 if the sprocket is rotated in the pre-wind direction, not permitting exposed film to be re-wound to the spool. Further, the advance wheel 26 may be turned in only a direction permitted by the anti-reversal pawl
25 24 to wind the film back into the film cassette (not shown).

In order to pre-wind the film onto the spool 20, the above mechanisms that prevent pre-winding of the film to the spool (striker finger 38b and release claw follower 38a limiting the direction of travel of the sprocket 28 and the anti-reversal pawl 24 limiting the direction of travel of the advance wheel 26) must be disengaged.

Referring more specifically to Figs. 5 and 6, a disengagement tool 40 is provided. The disengagement tool 40 includes the prongs 40a and 40b attached to the base portion 40c. A shaft 40d is connected to the base portion 40c. Shaft 40d may be a handle for manual manipulation, or may attach the base to a machine fixture for automated pre-winding of the film. Prongs 40a and 40b are dissimilar in structure and function. Prong 40a includes an angled tip 41 and an angled shoulder portion 42. Prong 40b includes a flat or slightly rounded tip 43.

In operation, the camera is pre-loaded with film in accordance with the present invention as follows. With the back cover off, the film counter is preset to a desired position as is known in the art, or as described in my co-pending, commonly assigned United States Patent Application entitled FILM COUNTER WHEEL AND METHOD FOR PRESETTING THE FILM COUNTER WHEEL DURING FILM PRE-LOADING, based from provisional patent application no. 60/400,917 and filed on even date herewith. Then a film cassette (not shown) is loaded into the film cassette receiving chamber 16. The film advance wheel 26 is engaged with the top of the film cassette for film re-winding by the consumer. A film leader (not shown) extending from the film cassette is engaged with the sprocket 28. A film take-up spool 20 is located in the film take-up spool chamber 18. The film leader is engaged with the film take-up spool 20. At this time the rear cover 15 is connected with the front cover 14 to form a light-tight barrier surrounding the film.

As shown more particularly in connection with Figs. 4 and 7, the camera may be placed on a jig or fixture (not shown) that automatically aligns the prongs 40a, 40b of the tool 40 with holes 14a, 14b through the front cover, respectively. Alternately, tool 40 may be used by hand. Additionally, a rotatable winding tool 50 is engaged with the socket 22 of the film take-up spool 20 either as part of an automated fixture, or by hand.

The prongs 40a and 40b of the disengagement tool 40 are passed through holes 14a and 14b of the front cover 14. Prong 40b passes over the film advance wheel 26 and the tip 43 engages the upper tab 24a of the anti-reversal pawl, pushing the pawl edge of the anti-reversal pawl 24 out of contact with the teeth of the advance wheel 26. This permits the advance wheel 26 to be freely rotated in either direction. Simultaneously, the

angled end 41 of prong 40 contacts the spur portion 38b of the release claw 38, moving the follower portion 38a out of contact with the sprocket primary cam 32. The inner surface of the prong 40a additionally pushes the striker 36a to the side, thus taking the striker finger 36b out of contact with the sprocket secondary cam 34. Free of the
5 follower portion 38a and the striker finger 36b, the sprocket may additionally travel freely in either the pre-winding or the film advance directions.

Once the disengagement tool 40 is in place as described, the rotatable tool 50 rotates in the pre-wind direction shown by arrow "x", and the film is wound onto the take-up spool 20. Through the use of the disengagement tool 40, the film may be pre-
10 wound after full camera assembly and under non-darkroom conditions. After pre-winding, the tools 40 and 50 are removed, the holes 14a, 14b may be covered by a decorative label or cardboard, if desired, rendering the camera 10 ready for use.

While the invention has been described with reference to certain embodiments, it will be understood by those skilled in the art that various changes may be made and
15 equivalents may be substituted for elements thereof without departing from the scope of the invention. In addition, many modifications can be made to adapt a particular situation or material to the teachings of the invention without departing from the essential scope thereof. Therefore, it is intended that the invention not be limited to the particular
embodiment disclosed as the best mode contemplated for carrying out this invention, but
20 that the invention will include all embodiments falling within the scope of the appended claims.